

meteoblue API data packages and images

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0 meteoblue API

0.1 What is the meteoblue API?

meteoblue provides high precision weather data for every place on land and sea, localised through point® technology.

The meteoblue API is an HTTP API which allows on-demand access to meteoblue weather data. Customers can request weather data in multiple formats or ready-to-use visualisations. The API handles requests almost instantaneously and can be integrated into automated systems, websites or applications easily.

0.2 Advantages of the meteoblue API

- Access to global weather data, anywhere on land and sea
- Request data on-demand for latitude and longitude coordinates
- Always up-to-date with nowcasting using measurements, radar and satellite telemetry
- Statistical forecast-model correction with deep learning
- Demand based pricing or flat rate pricing
- Minimize your own hosting infrastructure for weather data
- Unique APIkey to secure customers access and control requests
- Usage statistics updated in real-time
- New requests and future requirements can be managed in short time
- HTTPS and shared secret signed requests available for security

0.3 Definitions

meteoblue defines the following key terms relevant for this document as follows:

- API: Application Programming Interface
- HTTP request: A request made by a client to a web server using HTTP
- APIkey: Unique code granting access to the meteoblue API
- API-URL: The URL used for a request to the API
- Additional definitions can be found in chapter 0.4

0.4 Key Reference Documents

- meteoblue_API-data packages documentation_EN.pdf
- meteoblue_weather variables definitions_EN.pdf

1 API data packages

Various weather variables are grouped into packages. There are different packages for specific use cases:

- **Current:** Current weather
- **Sunmoon:** Information about sun and moon
- **Basic:** General purpose, contains the most common variables (e.g. temperature, precipitation, wind speed, relative humidity)
- **Clouds:** Detailed cloud layer information
- **Agro:** Designed for agriculture (e.g. evapotranspiration, soil temperature and soil moisture)
- **Wind:** For special wind purpose (e.g. wind gust, air density and 80m values)
- **Air:** Atmosphere simulations (e.g. CAPE, Lifted index)
- **Sea:** Marine weather forecast (e.g. wave heights, directions and frequencies)
- **Solar:** Solar radiation variables
- **PVPro:** For photovoltaic production
- **Multimodel:** Raw forecast data of multiple weather models
- **Trend:** 14 day ensemble forecast
- **Modelclimate:** Climate simulation data of last 30 years

Most of the data packages are offered with hourly, 3-hour and daily (aggregated) values. For “x-minute” the data is interpolated, it is available for 5, 6, 10, 15, 20 or 30 minutes.

Each package offers daily aggregations (min, max, mean, sum, total) depending on the weather variables. For example, the “basic-day” package aggregates temperature to daily minimum and maximum temperature.

All packages can be combined: You can request multiple packages for a single location at once. For example, “basic-1h” in combination with “wind-1h” contains all variables in hourly resolution from “basic” and “wind”. A detailed description can be found in chapter 4.

For some weather variable, **other units** are also available. For example, temperature can be queried as Fahrenheit. Wind speed is per default returned as metre-per-seconds, but can be converted to knots, beaufort, miles-per-hour or kilometres-per-hour. Other possible units for each variable can be seen in the tables below (column “Other units”).

The following tables give an overview of each API data package with corresponding variables, units and time intervals as well as possible aggregations.

1.1 Current

Table 1.1: meteoblue API data package variable list: "current"

#	Variable	Unit	Other units	Description	Comment
1.	Pictocode	1- 35		1- 35 (day and night)	Day and night pictograms
2.	Temperature	°C	°F	2m above ground	Temperature for indicated time
3.	Wind speed	m/s	km/h, knots, bf, mph	10m above ground	Wind speed for indicated time
4.	Is-day			1=day, 0=night	
5.	Is-observation			1=obs available, 0=no obs	

An example for a possible output is shown in Figure 1.1:

```
"data_current":
{
  "pictocode": 2,
  "time": "2016-02-03 16:00",
  "temperature": 6.00,
  "isdaylight": 1,
  "windspeed": 7.65,
  "isobserveddata": 1
}
```

Figure 1.1: Example of raw data for data-package "current"

1.2 Sunmoon

Table 1.2: meteoblue API data package variable list: "sunmoon"

#	Variable	Unit	Other units	Description	Comment
1.	Sunrise and sunset time	hh:mm			
2.	Moonrise and moonset time	hh:mm			
3.	Moon phase angle	degree			
4.	Moon age	days			
5.	Moon phase name	name			

An example for a possible output is shown in Figure 1.2:

```
},
"data_day":
{
  "time": ["2016-02-10", "2016-02-11", "2016-02-12", "2016-02-13", "2016-02-14", "2016-02-15", "2016-02-16", "2016-02-17", "2016-02-18", "2016-02-19",
"2016-02-20", "2016-02-21", "2016-02-22", "2016-02-23", "2016-02-24", "2016-02-25", "2016-02-26", "2016-02-27", "2016-02-28", "2016-02-29", "2016-03-01", "2016-03-02",
"2016-03-03", "2016-03-04", "2016-03-05", "2016-03-06", "2016-03-07", "2016-03-08", "2016-03-09", "2016-03-10", "2016-03-11", "2016-03-12"],
  "sunrise": ["07:07", "07:07", "07:07", "07:07", "07:07", "07:07", "07:07", "07:07", "07:07", "07:07", "07:07", "07:07", "07:07", "07:07", "07:07", "07:07", "07:07", "07:07", "07:07", "07:07", "07:07",
"06:06", "47:45", "44:42", "41:39", "37:36", "34:32", "30:29", "27:25", "23:21", "19:18", "16:14", "12:10", "08:06", "04:02", "00:58", "56:54", "52:50"],
  "sunset": ["17:17", "17:17", "17:17", "17:17", "17:17", "17:17", "17:17", "17:17", "17:17", "17:17", "17:17", "17:17", "17:17", "17:17", "17:17", "17:17", "17:17", "17:17", "17:17", "17:17", "17:17",
"18:18", "40:41", "43:45", "46:48", "49:51", "52:54", "56:57", "59:00", "02:03", "05:06", "08:09", "11:12", "14:15", "17:18", "20:21", "23:24", "26:27"]
}
```

Figure 1.2: Example of raw data for data package "sunmoon"

1.3 Webcolor

The meteoblue html color codes for web- formatting. Available only in combination with a data-package. For plotting numbers on the indicated colors, use the font- color specified in the feed.

Tabelle 1.3 meteoblue API data package variable list: "webcolor"

#	Variable	Unit	Other units	Description	Comment
1	Temperature	°C	°F		
2	Felt temperature	°C	°F		
3	Wind speed	m/s	km/h, knots, bf, mph		
4	UV-index	1- 11+			
5	Predictability	%			

An example for a possible output is shown in Figure 1.3:

```
"uvindex_color": ["#e82c0e", "#f8b600", "#f85900", "#e82c0e", "#e82c0e", null, null],
"temperature_max_color": ["#FDCA0C", "#F8DF0B", "#F8DF0B", "#FDCA0C", "#F88D00", "#FF6600", "#F88D00"],
"temperature_max_fontcolor": ["#000000", "#000000", "#000000", "#000000", "#000000", "#000000", "#000000"],
"temperature_min_color": ["#B5FF33", "#B5FF33", "#79D030", "#3CA12C", "#79D030", "#3CA12C", "#79D030"],
"temperature_min_fontcolor": ["#000000", "#000000", "#000000", "#ffffff", "#000000", "#ffffff", "#000000"],
"temperature_mean_color": ["#FFF600", "#D8F7A1", "#B5FF33", "#D8F7A1", "#FFF600", "#FFF600", "#FFF600"],
"temperature_mean_fontcolor": ["#000000", "#000000", "#000000", "#000000", "#000000", "#000000", "#000000"],
```

Figure 1.3: Example of raw data for data package "webcolor" in combination with "basic-day" data package

1.4 Basic

Table 1.4. meteoblue API data package variable list: "basic"

#	Variable	Unit	Other units	Description	Intervals in minutes	Intervals in hours	Daily aggregations	Comment
1.	Precipitation*	mm	inches	Water amount		1, 3, 24	Sum	
2.	Precipitation probability	%				1, 3, 24		
3.	Precipitation hours	h		Hours with precipitation		24		
4.	Convective precipitation*	mm	inches	Water amount		1, 3, 24	Sum	Caused by convective weather e.g. thunderstorms
5.	Snow fraction	0.0-1.0		0= rain, 1=snow		1, 3, 24		Fraction of precipitation that falls as snow
6.	Temperature	°C	°F	2m above ground	5, 6, 10, 15, 20, 30	1, 3, 24	Min, max, mean	
7.	Felt temperature	°C	°F	2m above ground	5, 6, 10, 15, 20, 30	1, 3, 24	Min, max	
8.	Pictocode	1-35, 1-17		1- 35 for hourly (day, night)		1, 3, 24	lday pictocode 1-17	
9.	Wind speed	m/s	km/h, knots, bf, mph	10m above ground	5, 6, 10, 15, 20, 30	1, 3, 24	Min, max, mean	
10.	Wind direction	°	2 char, 3 char	10m above ground	5, 6, 10, 15, 20, 30	1, 3, 24	Dominant	
11.	Relative humidity	%		Air humidity	5, 6, 10, 15, 20, 30	1, 3, 24	Min, max, mean	
12.	Humidity greater 90 hours	h				24		
13.	Sea level pressure	hPa		Corrected for sea level	5, 6, 10, 15, 20, 30	1, 3, 24	Min, max, mean	
14.	rainSPOT	0, 1, 2, 3, 9		0= no precipitation 1= 0.2-1.5mm 2= 1.5-5mm 3= > 5mm 9= 0.02- 0.2mm		1, 3, 24		Precipitation distribution around location. 7x7 array encoded from south to north, west to east

15. Predictability	%				24		
16. Predictability class	0-5		0= very low, 5= very high		24		
17. UV-index	1-11+		0m above ground		24		

* Do not compute the sum of precipitation and convective precipitation, as precipitation is already the total amount.

1.5 Clouds

Table 1.5. meteoblue API data package variable list: "clouds"

#	Variable	Unit	Other units	Description	Intervals in minutes	Intervals in hours	Daily aggregations	Comment
1.	Low clouds	%		Cover of the sky		1, 3, 24	Min, max, mean	
2.	Mid clouds	%		Cover of the sky		1, 3, 24	Min, max, mean	
3.	High clouds	%		Cover of the sky		1, 3, 24	Min, max, mean	
4.	Total cloud cover	%		Cover of the sky		1, 3, 24	Min, max, mean	Analogue to METAR 0-8
5.	Visibility	km		Distance		1, 3, 24	Min, max, mean	
6.	Sunshine Time	min/h		Direct sunlight		1, 3, 24	Min/day	Depends also on day length

1.6 Agro

Table 1.6. meteoblue API data package variable list: "agro"

#	Variable	Unit	Other units	Description	Intervals in minutes	Intervals in hours	Daily aggregations	Comment
1.	Skin/ Surface temperature	°C	°F	Soil surface or skin		1, 3, 24	Min, max, mean	
2.	Total evapotranspiration	mm		Assuming typical soil and vegetation		1, 3, 24	Sum	
3.	Potential evapotranspiration	mm		Assuming unlimited water supply		1, 3, 24	Sum	
4.	Leaf wetness index	0; 1		Dew on leaves		1, 3, 24	Mean	
5.	Soil temperature (0- 10cm)	°C	°F	Assuming typical soil		1, 3, 24	Min, max, mean	
6.	Soil moisture (0- 10cm)	%		Assuming typical soil		1, 3, 24	Min, max, mean	
7.	Dew point temperature	°C	°F	2m above ground		1, 3, 24	Min, max, mean	

1.7 Wind

Table 1.7. meteoblue API data package variable list: "wind"

#	Variable	Unit	Other units	Description	Intervals in minutes	Intervals in hours	Daily aggregations	Comment
1.	Gust wind	m/s	km/h, knots, bf, mph	10m above ground	5, 6, 10, 15, 20, 30	1, 3, 24	Min, max, mean	
2.	Wind direction 80m	°	2 char, 3 char	80m above ground	5, 6, 10, 15, 20, 30	1, 3, 24	Dominant	
3.	Wind speed 80m	m/s	km/h, knots, bf, mph	80m above ground	5, 6, 10, 15, 20, 30	1, 3, 24	Min, max, mean	
4.	Air density	kg/m ³		As result of altitude and temperature	5, 6, 10, 15, 20, 30	1, 3, 24	Min, max, mean	
5.	Air pressure		at surface height	not reduced to sea level	5, 6, 10, 15, 20, 30	1, 3, 24	Min, max, mean	

1.8 Air

Table 1.8. meteoblue API data package variable list: "air"

#	Variable	Unit	Other units	Description	Intervals in minutes	Intervals in hours	Daily aggregations	Comment
1.	CAPE	J/kg		Convective Available Potential Energy		1, 3, 24	Min, max, mean	
2.	Lifted index	J/kg		Risk of thunderstorms		1, 3, 24	Min, max, mean	
3.	Boundary layer height	m		Layer with inversion		1, 3, 24	Min, max, mean	
4.	Helicity	m ² s ²				1, 3, 24	Min, max, mean	
5.	Convective inhibition	m				1, 3, 24	Min, max, mean	
6.	Cloud ice	g				1, 3, 24	Min	Total column (ground to top of atmosphere)
7.	Cloud water	g				1, 3, 24	Min, max, mean	Total column (ground to top of atmosphere)

1.9 Sea

Table 1.9. meteoblue API data package variable list: "sea"

#	Variable	Unit	Other units	Description	Intervals in minutes	Intervals in hours	Daily aggregations	Comment
1.	Significant wave height	m		Average of all waves		1, 3, 24	Min, max, mean	Effective wave height (as would be observed, not average wave height)
2.	Wind wave direction	°		Average for open sea		1, 3, 24	Dominant	Direction to which the waves move
3.	Sea surface temperature	°C	°F	Average for (open) sea		1, 3, 24	Mean	
4.	Wind wave height	m		Highest 3 of wind waves		1, 3, 24	Min, max, mean	
5.	Mean wind wave period	s		Majority of waves		1, 3, 24	Min, max, mean	
6.	Primary wave direction	°		Average of all waves		1, 3, 24	Dominant	Direction to which the waves move
7.	Primary wave mean period	s		Average of all waves		1, 3, 24	Min, max, mean	
8.	Significant height of swell waves	m		Highest waves average		1, 3, 24	Min, max, mean	
9.	Mean period of swell waves	s		Highest waves average		1, 3, 24	Min, max, mean	

1.10 Solar

Table 1.10. meteoblue API data package variable list: "solar"

#	Variable	Unit	Other units	Description	Intervals in minutes	Intervals in hours	Daily aggregations	Comment
1.	GHI (Solar radiation)	W/m ²	J/cm ²	Global Horizontal Radiation	5, 6, 10, 15, 20, 30	1, 24	Total	
2.	DIF	W/m ²	J/cm ²	Diffuse Radiation	5, 6, 10, 15, 20, 30	1, 24	Total	
3.	DNI	W/m ²	J/cm ²	Direct Normalized Irradiance (Radiation)	5, 6, 10, 15, 20, 30	1, 24	Total	
4.	GNI	W/m ²	J/cm ²	Global Normalized Irradiance (Radiation)	5, 6, 10, 15, 20, 30	1, 24	Total	
5.	Extraterrestrial solar radiation	W/m ²	J/cm ²	Extraterrestrial solar radiation	5, 6, 10, 15, 20, 30	1, 24	Total	

1.11 PVpro

Table 1.11. meteoblue API data package variable list: "pvpro"

#	Variable	Unit	Other units	Description	Intervals in minutes	Intervals in hours	Daily aggregations	Comment
1.	PV power	kWh	mW/h	Photovoltaic power	5, 6, 10, 15, 20, 30	1, 24	Total	
2.	GTI	W/m ²	J/cm ²	Global Tilted Irradiance (Radiation)	5, 6, 10, 15, 20, 30	1, 24	Total	
3.	Performance ratio	%			5, 6, 10, 15, 20, 30	1		
4.	Module temperature	°C	°F		5, 6, 10, 15, 20, 30	1, 24	Mean	
5.	IAM	%		Incidence Angle Modifier	5, 6, 10, 15, 20, 30	1		
6.	Snow cover	cm		On the PV modules	5, 6, 10, 15, 20, 30	1, 24	Mean	Considers inclination

Special variables:

kilowatt peak: &kwp=...

slope = inclination of solar panel: &slope=...

facing = orientation of the solar panel: &facing=...

Example: &slope=20&kwp=1&facing=180

1.12 Multimodel

The multimodel consists of pure raw model output- no post-processing or corrections. There are no guarantees of delivery of any particular model or of the timing on the update of any particular model. Models may be removed in the future or others maybe added. No quality control of any kind can be performed on third party models shown in the feed. And all other feeds use the best post-processed forecast possible (which cannot be derived from multimodel). The multimodel data-package is not available in csv format.

Table 1.12. meteoblue API data package variable list: "multimodel".

#	Variable	Unit	Other units	Description	Intervals in minutes	Intervals in hours	Daily aggregations	Comment
1.	Temperature	°C	°F	2m above ground		1, 3		
2.	Wind speed	km/h	m/s, knots, bf, mph	10m above ground		1, 3		
3.	Wind direction	°	2 char, 3 char	10m above ground		1, 3		
4.	Precipitation	mm	inches	Water amount		1, 3		
5.	Cloud cover	%		Cover of the sky		1, 3		Analogue to METAR 0-8
6.	Temperature spread	°C	°F	2m above ground		1, 3		
7.	Wind speed spread	km/h	m/s, knots, bf, mph	10m above ground		1, 3		

1.13 Trend

Trend contains always the same number of ensembles and members, globally, and for 14 days, so consistency over forecast period (14 days) and geography (world) is guaranteed. Trend ranges are therefore those to be used for windspeed calculations.

Table 1.13. meteoblue API data package variable list: "trend"

#	Variable	Unit	Other units	Description	Intervals in minutes	Intervals in hours	Daily Aggregations	Comment
1.	Pictocode	1- 17	day pictocode 1- 17	lday pictocode 1- 17		24	lday pictocode 1- 17	
2.	Temperature	°C	°F	2m above ground		24	Min, max, mean	
3.	Wind speed	m/s	km/h, knots, bf, mph	10m above ground		24	Min, max, mean	
4.	Wind direction	°	2 char, 3 char	10m above ground		24	Dominant	
5.	Precipitation	mm	inches	Water amount		24	Sum	
6.	Precipitation probability	%				24		
7.	Sea level pressure	hPa		Corrected for sea level		24	Mean	
8.	Relative humidity	%		Air humidity		24	Min, max, mean	
9.	Temperature spread	°C	°F	2m above ground		24	Ensemble members spread (1 standard deviation)	
10.	Wind speed spread	m/s	km/h, knots, bf, mph	10m above ground		24	Ensemble members spread (1 standard deviation)	
11.	Precipitation spread	mm	2 char, 3 char	Water amount		24	Ensemble members spread (1 standard deviation)	

1.14 Modelclimate

Tabelle 1.14: meteoblue API data package variable list: "modelclimate"

#	Variable	Unit	Other units	Description	Comment
1.	precipitation_mean	mm	inch	Average monthly precipitation sum	
2.	temperature_mean_monthly_max	°C	°F	Mean monthly maximum	"Hot days"
3.	temperature_mean_daily_max	°C	°F	Mean daily maximum	
4.	temperature_mean	C°	°F	Mean	
5.	temperature_mean_monthly_min	°C	°F	Mean monthly minimum	"Cold days"
6.	temperature_mean_daily_min	°C	°F	Mean daily minimum	
7.	windspeed_mean_monthly_max	m/s	km/h, knots, bf, mph	Mean monthly maximum	"Windy days"
8.	windspeed_mean_daily_max	m/s	km/h, knots, bf, mph	Mean daily maximum	
9.	windspeed_mean	m/s	km/h, knots, bf, mph	Mean	
10.	windspeed_mean_daily_min	m/s	km/h, knots, bf, mph	Mean daily minimum	
11.	windspeed_mean_monthly_min	m/s	km/h, knots, bf, mph	Mean monthly minimum	
12.	precipitation_days	0-31		amount of days with more than 0.2mm precipitation	
13.	snow_days	0-31		days with snowfall	
14.	frost_days	0-31		days with temperature below 0°C	
15.	sunshine_days	0-31		Sum of these 3 values (15, 16, 17) equals the amount of days in a month	
16.	cloudy_days	0-31			
17.	overcast_days	0-31			

2 API Images

2.1 Meteogram

URL example:

http://my.meteoblue.com/visimage/meteogram_web?apikey=xxxxxxxx&lat=47.5584&lon=7.5733&asl=279&tz=Europe%2FZurich&city=Basel

Special variables:

http://my.meteoblue.com/visimage/meteogram_picto (with picto icons)

http://my.meteoblue.com/visimage/meteogram_picto_nologo (with picto icons but without meteoblue logo)

<http://my.meteoblue.com/visimage/meteogram> (without picto icons)

http://my.meteoblue.com/visimage/meteogram_picto_hd (with picto icons and in HD quality)

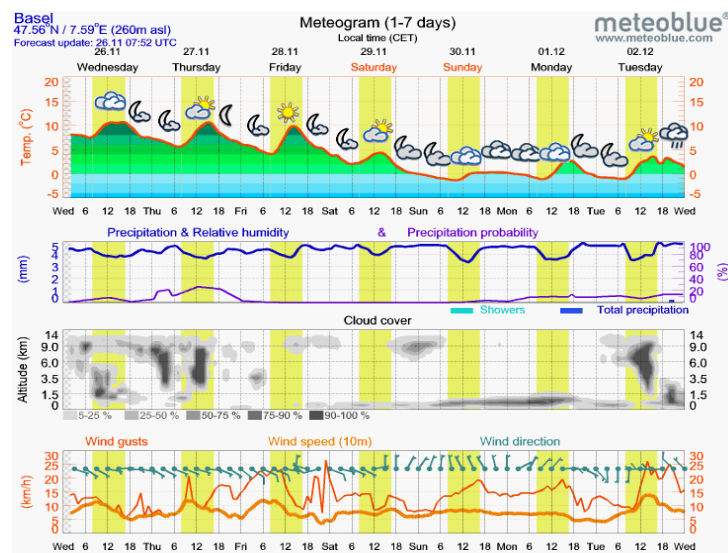


Figure 2.1: meteoblue API image "meteogram_picto"

2.2 Meteogram All-in-One

URL example:

[http://my.meteoblue.com/visimage/meteogram_one?
apikey=xxxxxxxx&lat=47.5584&lon=7.5733&asl=279&tz=Europe%2FZurich&city=Basel](http://my.meteoblue.com/visimage/meteogram_one?apikey=xxxxxxxx&lat=47.5584&lon=7.5733&asl=279&tz=Europe%2FZurich&city=Basel)

Special variables:

http://my.meteoblue.com/visimage/metgeogram_one_nologo (without meteoblue logo)

http://my.meteoblue.com/visimage/metgeogram_hd (in HD quality)

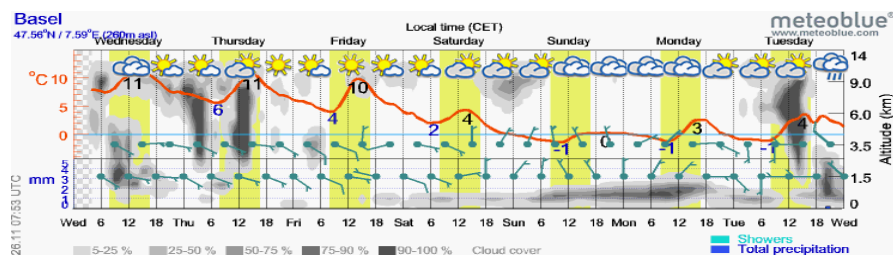


Figure 2.2: meteoblue API image "meteogram_one"

2.3 Meteogram WIND

Area meteogram, showing the vertical structure of the atmosphere, focusing on wind.

URL example:

[http://my.meteoblue.com/visimage/meteogram_wind?
apikey=xxxxxxxx&lat=47.5584&lon=7.5733&asl=279&tz=Europe%2FZurich&city=Basel](http://my.meteoblue.com/visimage/meteogram_wind?apikey=xxxxxxxx&lat=47.5584&lon=7.5733&asl=279&tz=Europe%2FZurich&city=Basel)

Special variables:

http://my.meteoblue.com/visimage/meteogram_wind_hd (in HD quality)

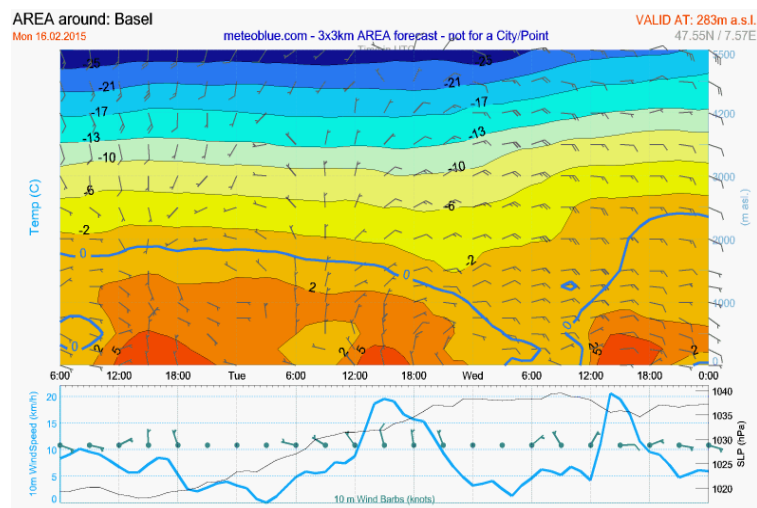


Figure 2.3: meteoblue API image "meteogram_wind"

2.4 Meteogram AGRO

URL example:

[http://my.meteoblue.com/visimage/meteogram_agro?
apikey=xxxxxxxx&lat=47.5584&lon=7.5733&asl=279&tz=Europe%2FZurich&city=Basel](http://my.meteoblue.com/visimage/meteogram_agro?apikey=xxxxxxxx&lat=47.5584&lon=7.5733&asl=279&tz=Europe%2FZurich&city=Basel)

Special variables:

http://my.meteoblue.com/visimage/meteogram_agro_nologo (without meteoblue logo)

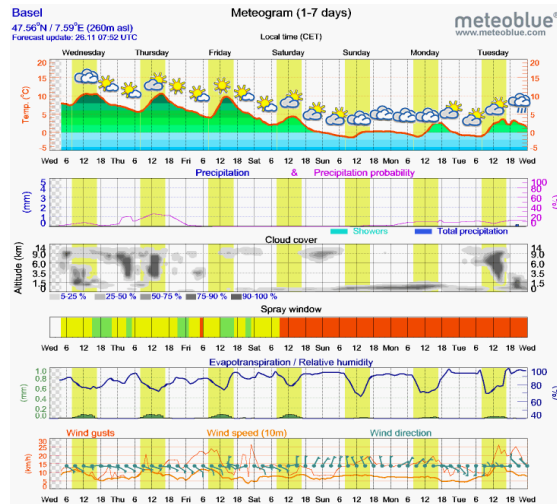


Figure 2.4: meteoblue API image "meteogram_agro"

2.5 Meteogram AGROSOWING

URL example:

http://my.meteoblue.com/visimage/meteogram_agroSowing?apikey=xxxxxxxx&lat=47.5584&lon=7.5733&asl=279&tz=Europe%2FZurich&city=Basel&look=all

Special variables:

&look=all (or 'maize','wheat','barley','rapeseed','potato','sugarbeets')

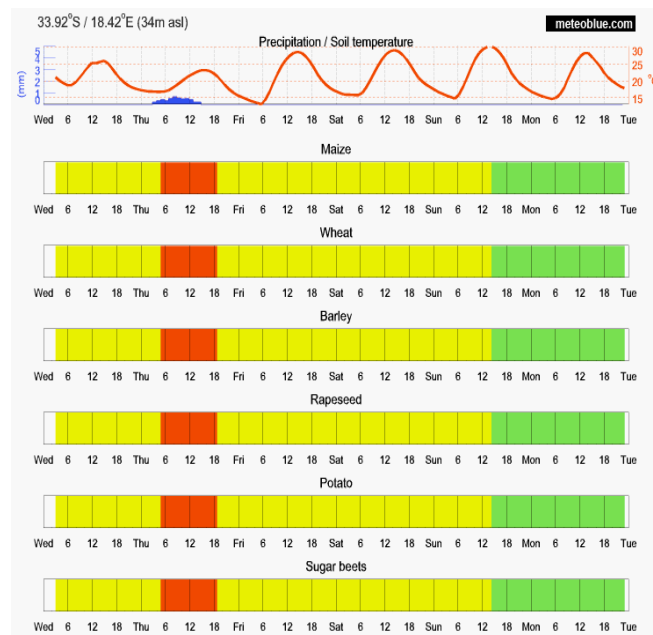


Figure 2.5: meteoblue API image "meteogram_agroSowing"

2.6 Meteogram AGROSPRAYING

URL example:

http://my.meteoblue.com/visimage/meteogram_agroSpraying?apikey=xxxxxxxx&lat=47.5584&lon=7.5733&asl=279&tz=Europe%2FZurich&city=Basel

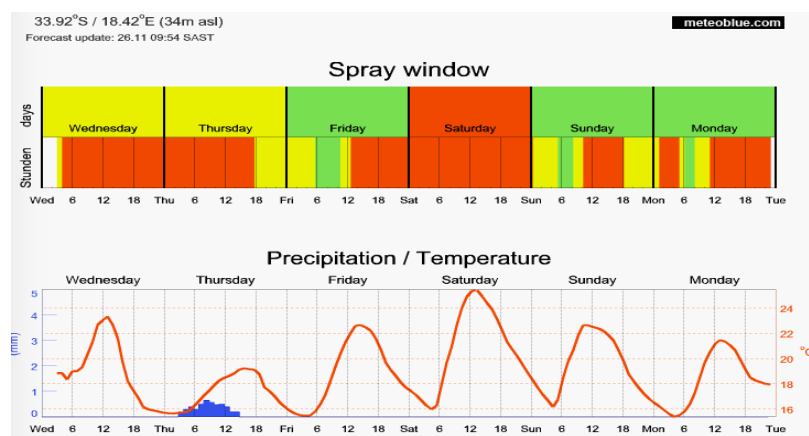


Figure 2.6: meteoblue API image "meteogram_agroSpraying"

2.7 Meteogram SNOW

Shows the vertical structure of temperature in the atmosphere as well as snowfall, snow-melt and estimated snow depth.

URL example:

http://my.meteoblue.com/visimage/meteogram_snow?apikey=xxxxxxx&lat=47.5584&lon=7.5733&asl=279&tz=Europe%2FZurich&city=Basel

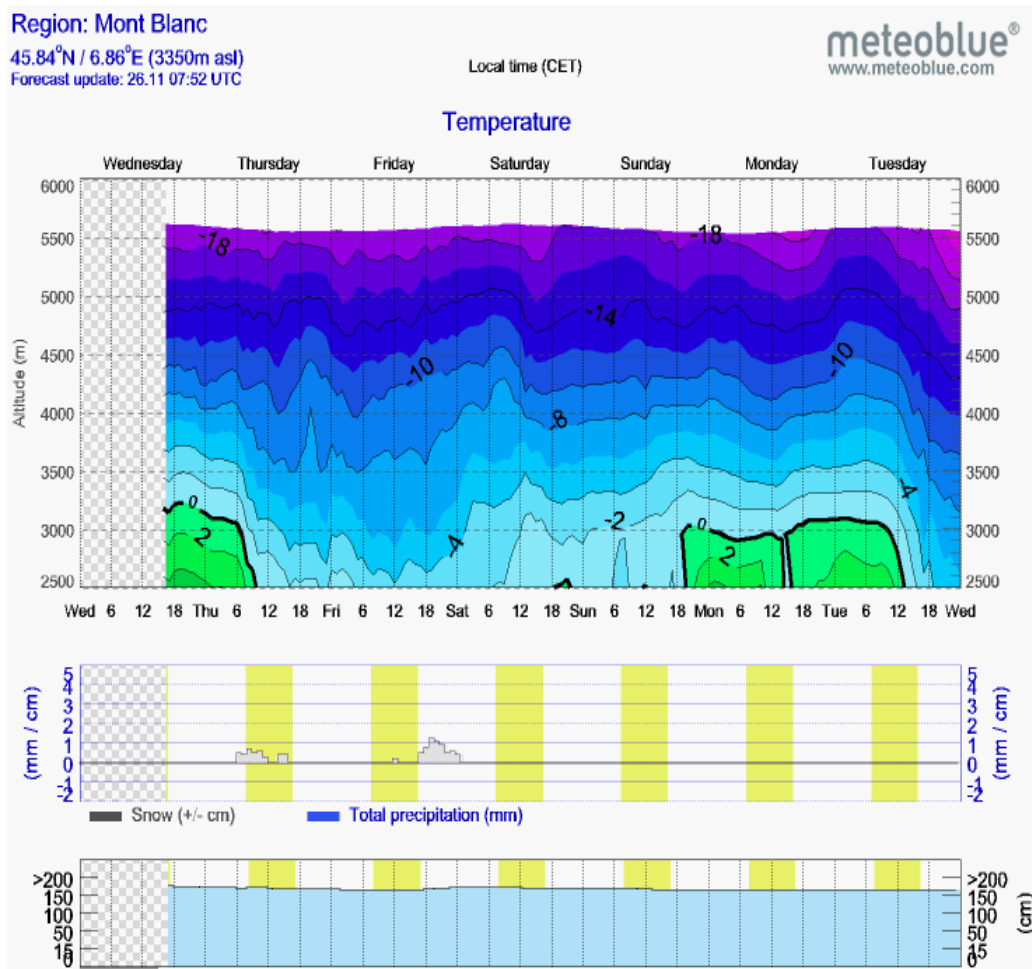


Figure 2.7: meteoblue API image "meteogram_snow"

2.8 Meteogram multimodel

Remarks:

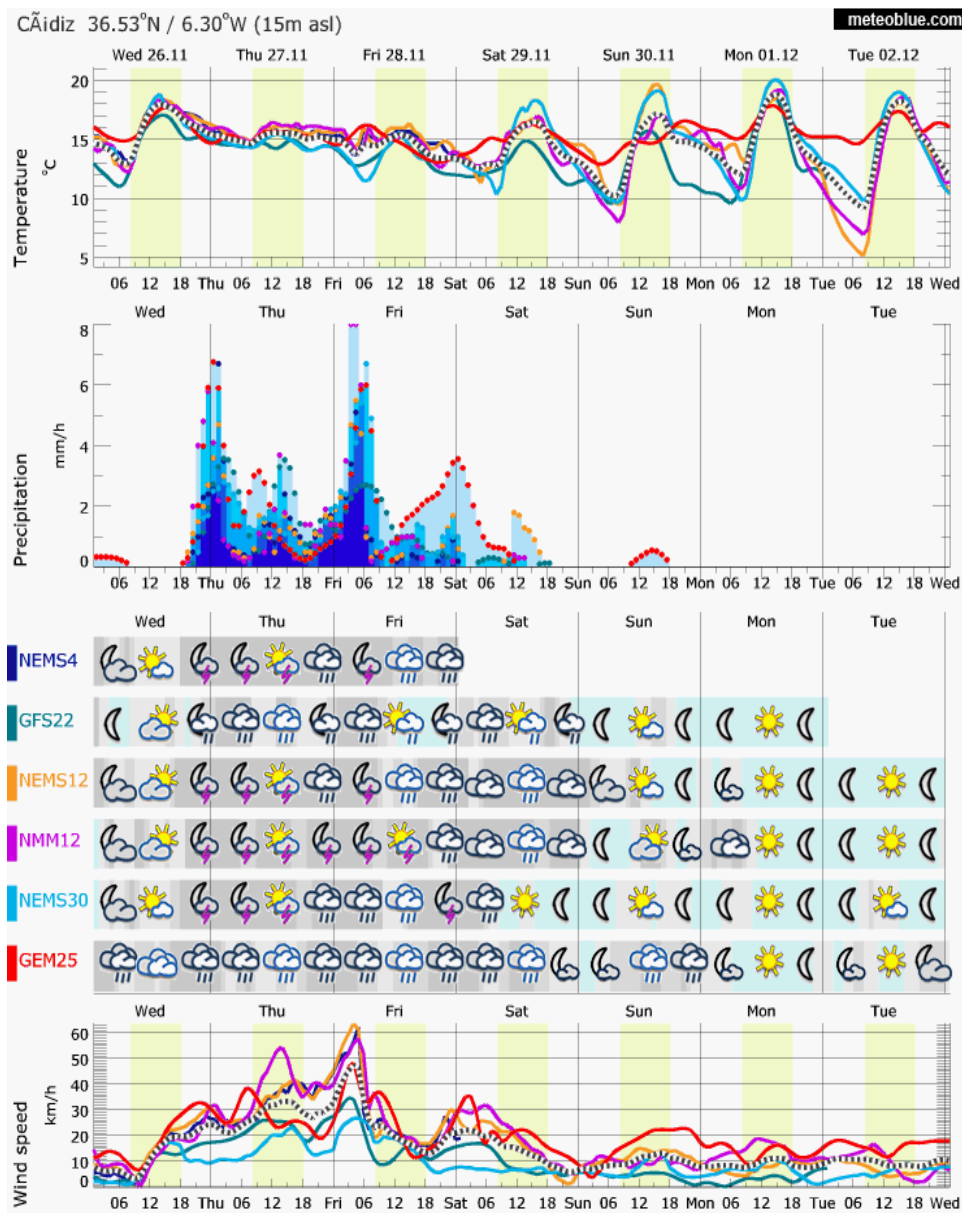
The number of models shown may vary from day to day. There is no guarantee a certain model will be present at any time. The image size of the meteogram thus can vary from day to day.

URL example:

http://my.meteoblue.com/visimage/meteogram_multiSimple?apikey=xxxxxxxx&lat=47.5584&lon=7.5733&asl=279&tz=Europe%2FZurich&city=Basel

Special variables:

http://my.meteoblue.com/visimage/meteogram_multiSimple_hd (in HD quality)



2.9 Meteogram 14 day

URL example:

http://my.meteoblue.com/visimage/meteogram_14day?apikey=xxxxxxxx&lat=47.5584&lon=7.5733&asl=279&tz=Europe%2FZurich&city=Basel

Special variables:

http://my.meteoblue.com/visimage/meteogram_14day
http://my.meteoblue.com/visimage/meteogram_14day_nologo (without meteoblue logo)
http://my.meteoblue.com/visimage/meteogram_14day_hd (in HD quality)

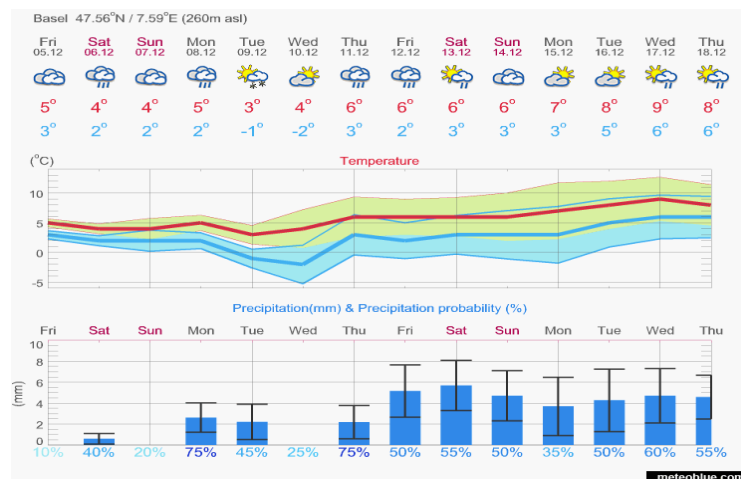


Figure 2.9: Figure 2.9: meteoblue API image "meteogram_14day"

2.10 Meteogram Ensemble (14 days detail)

URL example:

http://my.meteoblue.com/visimage/meteogram_ens?apikey=xxxxxxxx&lat=47.5584&lon=7.5733&asl=279&tz=Europe%2FZurich&city=Basel

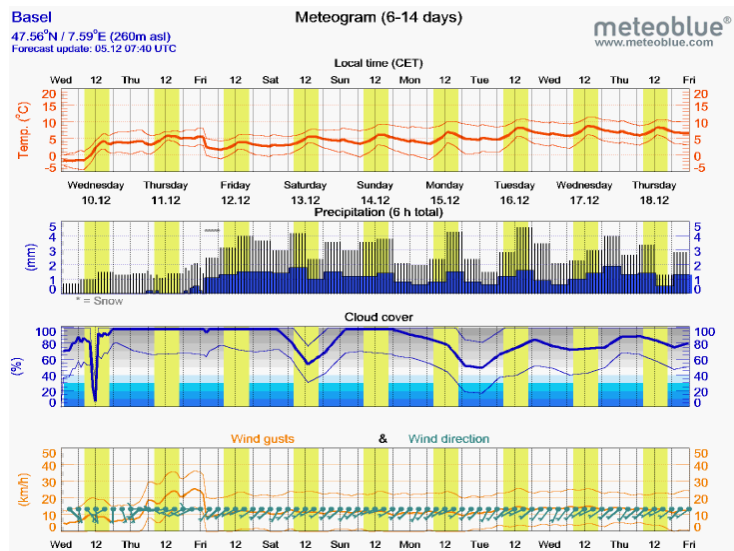


Figure 2.10: meteoblue API image "meteogram_ens"

2.11 Pictoprint

URL example:

[http://my.meteoblue.com/visimage/pictoprint?
apikey=xxxxxxxx&lat=47.5584&lon=7.5733&asl=279&tz=Europe%2FZurich&city=Basel](http://my.meteoblue.com/visimage/pictoprint?apikey=xxxxxxxx&lat=47.5584&lon=7.5733&asl=279&tz=Europe%2FZurich&city=Basel)

Special variables (optional):

*&look=sday*tu* (use this to show a single particular day specified by mo, tu, we, th, fr, sa, su)

&look=3days (use this look to show a 3 day forecast)

&look=1day (use this to show just the current day)

&look=usunits (all pictoprints also available with US-units)

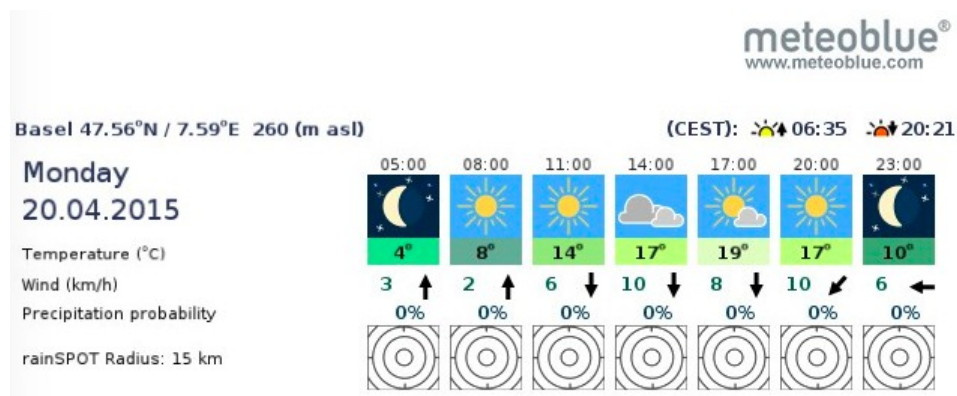


Figure 2.11: meteoblue API image "pictoprint"

2.12 PictoprintDay

URL example:

[http://my.meteoblue.com/visimage/pictoprintDay?
apikey=xxxxxxxx&lat=47.5584&lon=7.5733&asl=279&tz=Europe%2FZurich&city=Basel](http://my.meteoblue.com/visimage/pictoprintDay?apikey=xxxxxxxx&lat=47.5584&lon=7.5733&asl=279&tz=Europe%2FZurich&city=Basel)

Special variables (optional):

&look=nodescript (without description)

&forecastlength=72 (72 hours of forecast range)

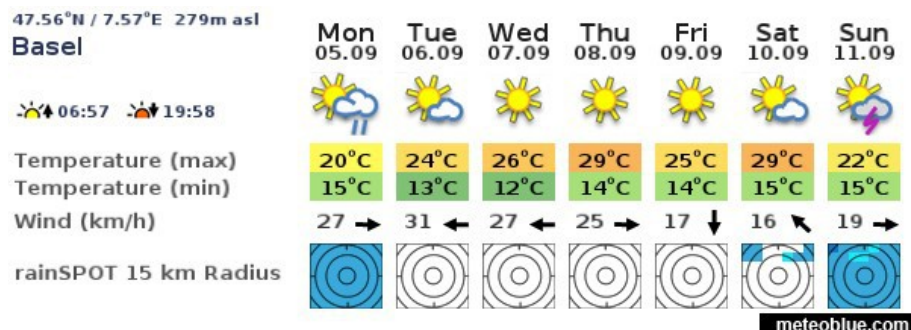


Figure 2.12: meteoblue API image "pictoprintDay"

2.13 PictoprintDaySimple

URL example:

<http://my.meteoblue.com/visimage/pictoprintDaySimple?apikey=xxxxxxxx&lat=47.5584&lon=7.5733&asl=279&tz=Europe%2FZurich&city=Basel>

Special variables (optional):

&look=nodescript (without description)

&forecastlenght=72 (72 hours of forecast range)

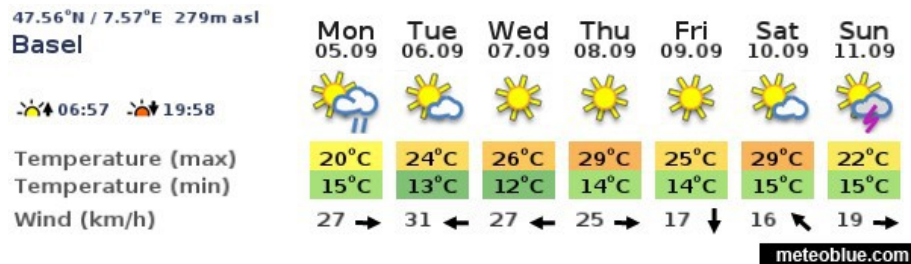


Figure 2.13: meteoblue API image "pictoprinDaySimple"

2.14 PictoprintDayUvRain

URL example:

<http://my.meteoblue.com/visimage/pictoprintDayUvRain?apikey=xxxxxxxx&lat=47.5584&lon=7.5733&asl=279&tz=Europe%2FZurich&city=Basel>

Special variables (optional):

&look=nodescript (without description)

&forecastlenght=72 (72 hours of forecast range)

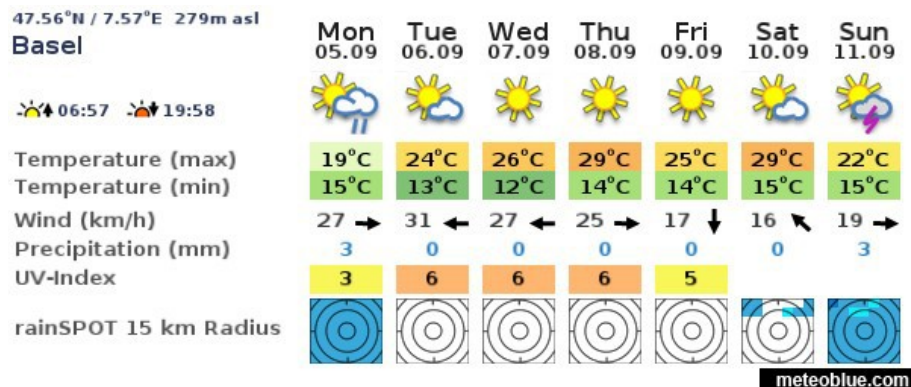


Figure 2.14: meteoblue API image "pictoprintDayUvRain"

2.15 Meteogram AIR

Area meteogram showing the vertical structure of the atmosphere. Time always in UTC. No language support (only English available).

URL example:

http://my.meteoblue.com/visimage/meteogram_air?apikey=xxxxxxx&lat=47.5584&lon=7.5733&asl=279&tz=Europe%2FZurich&city=Basel

Special variables:

http://my.meteoblue.com/visimage/meteogram_air_hd (in HD quality)

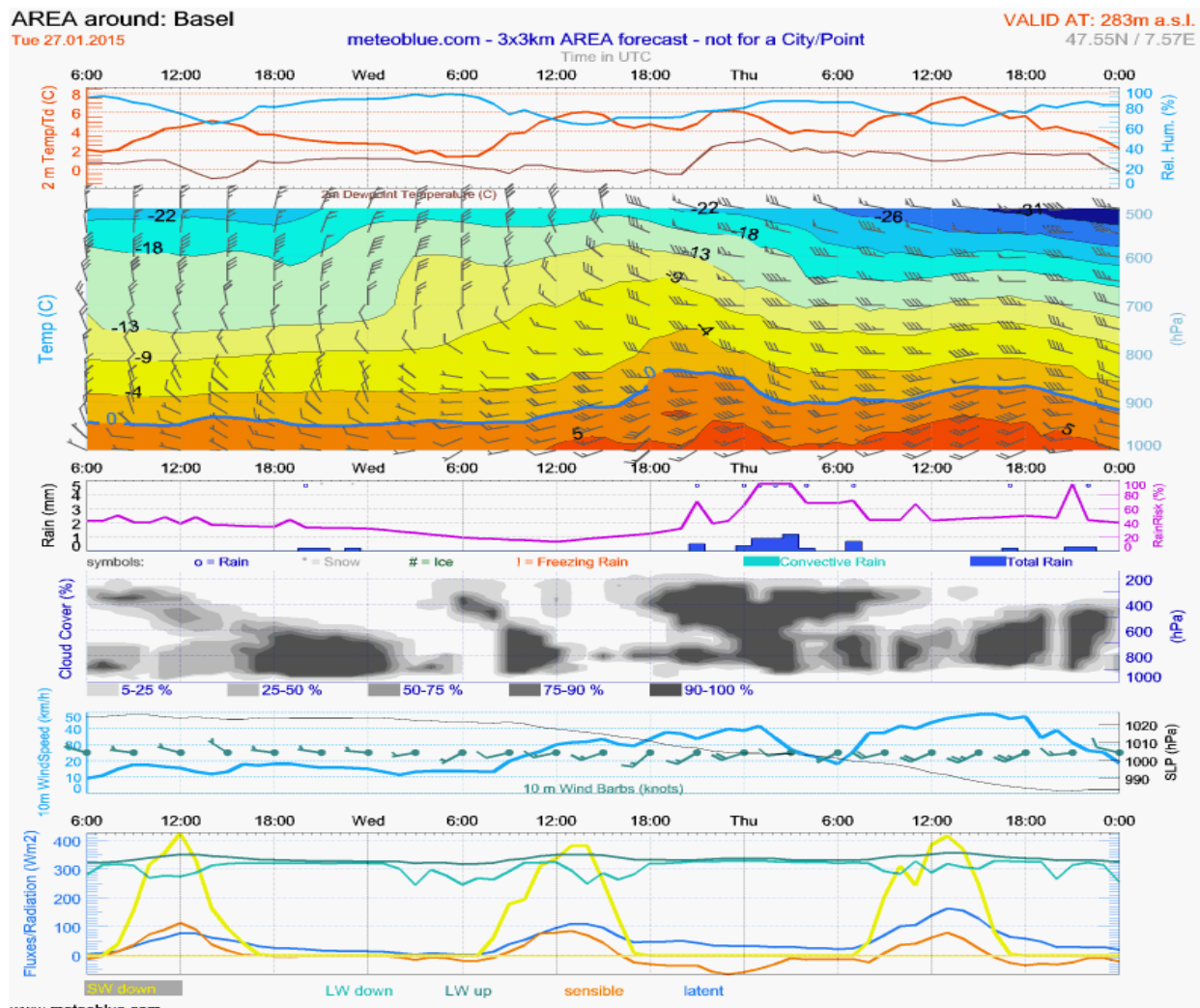


Figure 2.15: meteoblue API image "meteogram_air"

2.16 Sounding

Tephi- Diagram vertical sounding. Available for every forecast hour. In some regions it only available every 3rd hour. No language support (only English available).

URL example:

[http://my.meteoblue.com/visimage/sounding?
apikey=xxxxxxxx&lat=47.5584&lon=7.5733&asl=279&tz=Europe%2FZurich&city=Basel](http://my.meteoblue.com/visimage/sounding?apikey=xxxxxxxx&lat=47.5584&lon=7.5733&asl=279&tz=Europe%2FZurich&city=Basel)

Special variables:

¶ms=YYYYMMDDHH specifies the valid time in UTC
http://my.meteoblue.com/visimage/sounding_hd (in HD quality)

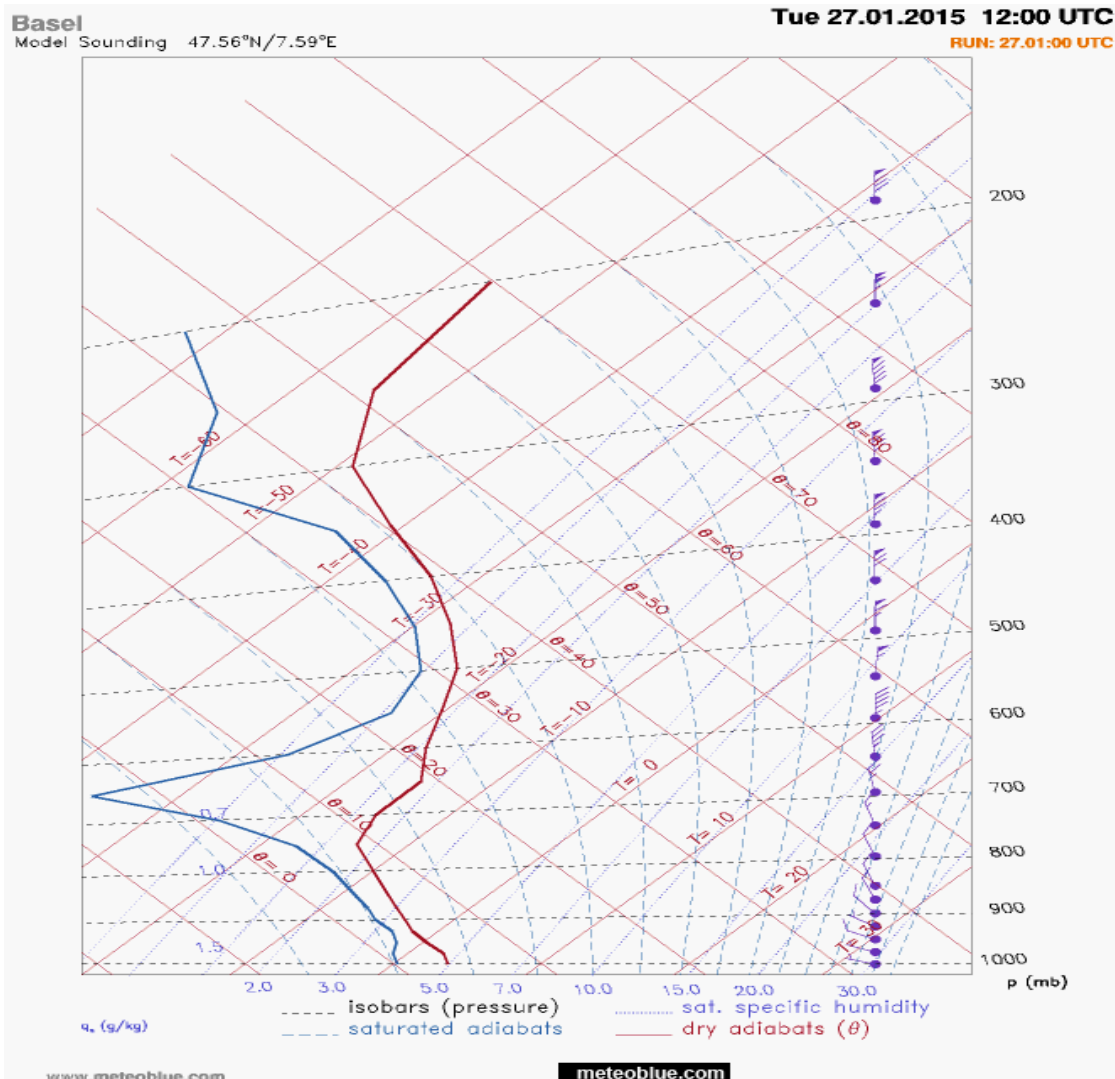


Figure 2.16: meteoblue API image "sounding"

2.17 Backward trajectory / Forward trajectory

Shows backward or forward trajectory from specified location at specified vertical level above ground. The trajectory stays on the specified vertical level and thus neglects vertical motion!

URL example:

[http://my.meteoblue.com/visimage/forward_trajectory?
apikey=xxxxxxx&lat=47.5584&lon=7.5733&asl=279&tz=Europe%2FZurich&city=Basel](http://my.meteoblue.com/visimage/forward_trajectory?apikey=xxxxxxx&lat=47.5584&lon=7.5733&asl=279&tz=Europe%2FZurich&city=Basel)

[http://my.meteoblue.com/visimage/backward_trajectory?
apikey=xxxxxxx&lat=47.5584&lon=7.5733&asl=279&tz=Europe%2FZurich&city=Basel](http://my.meteoblue.com/visimage/backward_trajectory?apikey=xxxxxxx&lat=47.5584&lon=7.5733&asl=279&tz=Europe%2FZurich&city=Basel)

Special variables:

¶ms= (forecast hour of release (forward trajectory) or arrival (backward trajectory) at specified location. Formate: yyyyymmddhh)

&fcstlength= (compute trajectories for this number of hours)

&level= (vertical level used for trajectory: 'surface' or pressure levels (hPa) e.g.: 850, 700, 500. Maximum is 200.)

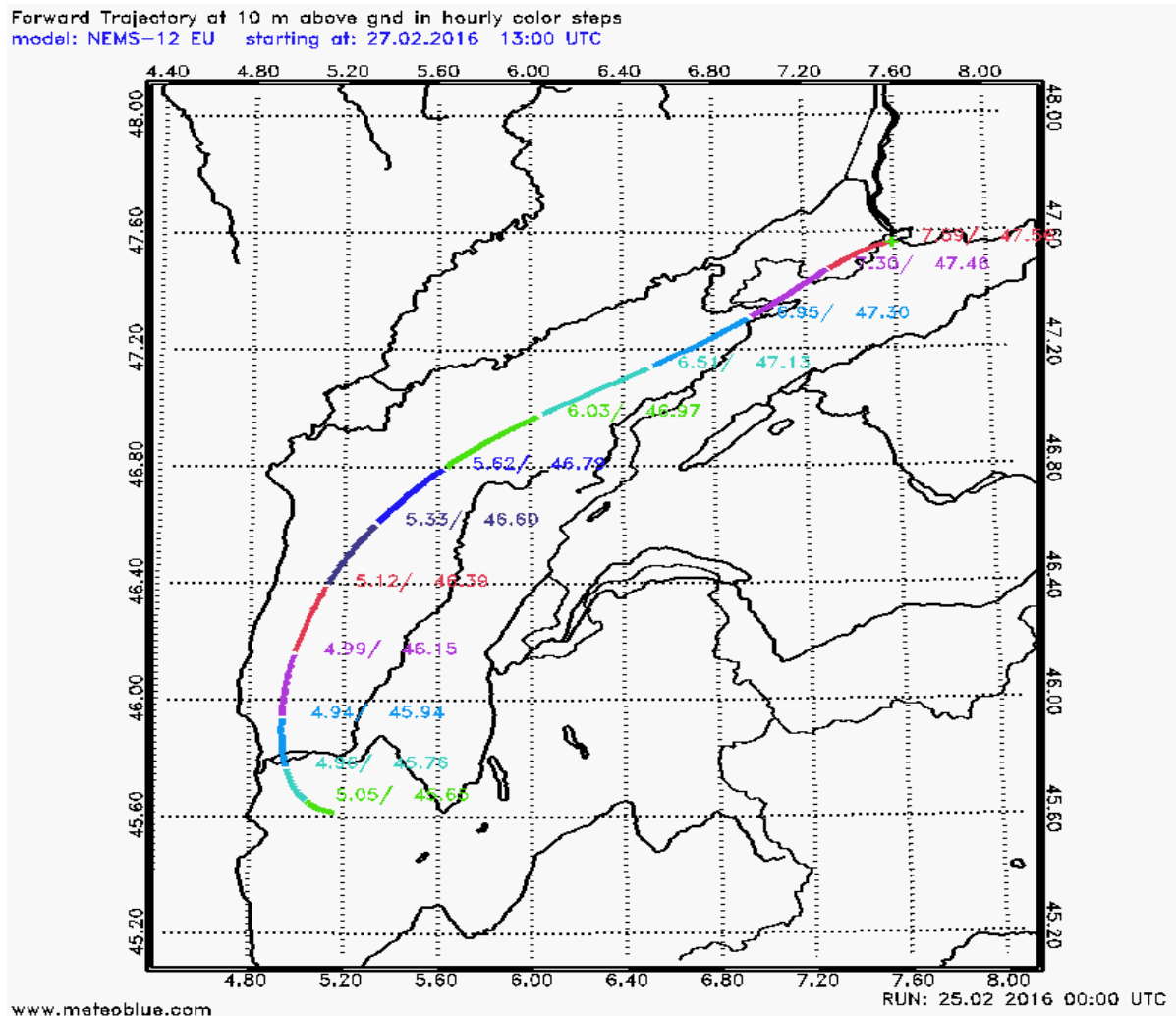


Figure 2.17: meteoblue API image "forward_trajectory"

2.18 Cross-section Clouds

Shows instantaneous cloud cover (without parametrised convective clouds) and accumulated precipitation of the last 3 hours relative to the time indicated.

URL example:

http://my.meteoblue.com/visimage/crossSection_clouds?apikey=xxxxxxx&lat=47.5584&lon=7.5733&asl=279&tz=Europe%2FZurich&city=Basel

Special variables:

&fcstlength= (shows cross section for this forecast hour)

¶ms= the length of the cross-section in decimal degrees (latitude)

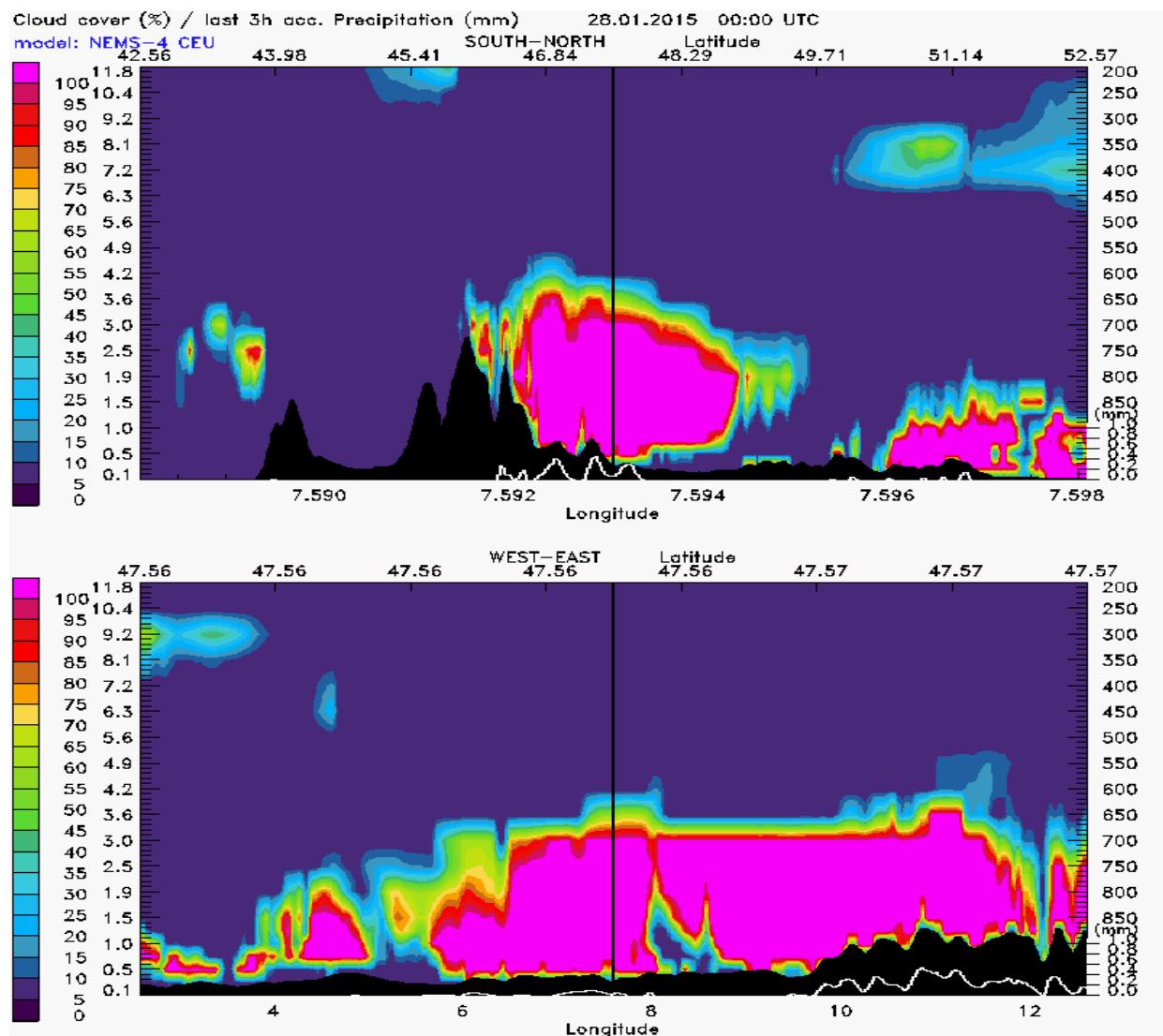


Figure 2.18: meteoblue API image "crossSection_clouds"

2.19 Cross-section Temperature

Shows temperature and wind.

URL example:

http://my.meteoblue.com/visimage/crossSection_temp?apikey=xxxxxxxx&lat=47.5584&lon=7.5733&asl=279&tz=Europe%2FZurich&city=Basel

Special variables:

&fcstlength= (show cross section for this forecast hour)

¶ms= (the length of the cross-section in degrees)

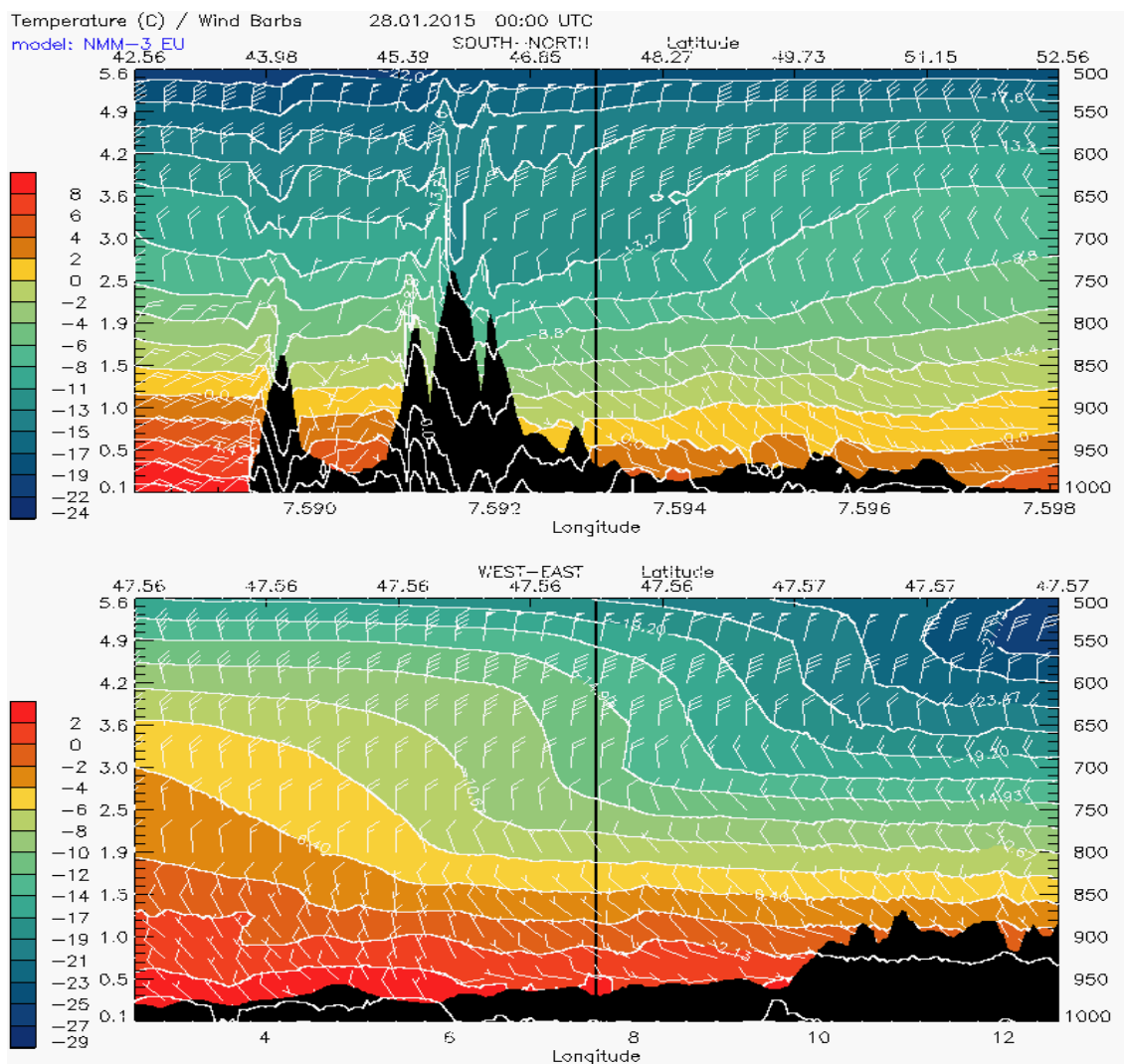


Figure 2.19: meteoblue API image "crossSection_temp"

2.20 Cross-section Wind

URL example:

http://my.meteoblue.com/visimage/crossSection_wind?apikey=xxxxxxx&lat=47.5584&lon=7.5733&asl=279&tz=Europe%2FZurich&city=Basel

Special variables:

&fcstlength= (show cross section for this forecast hour)

¶ms= (the length of the cross-section in degrees)

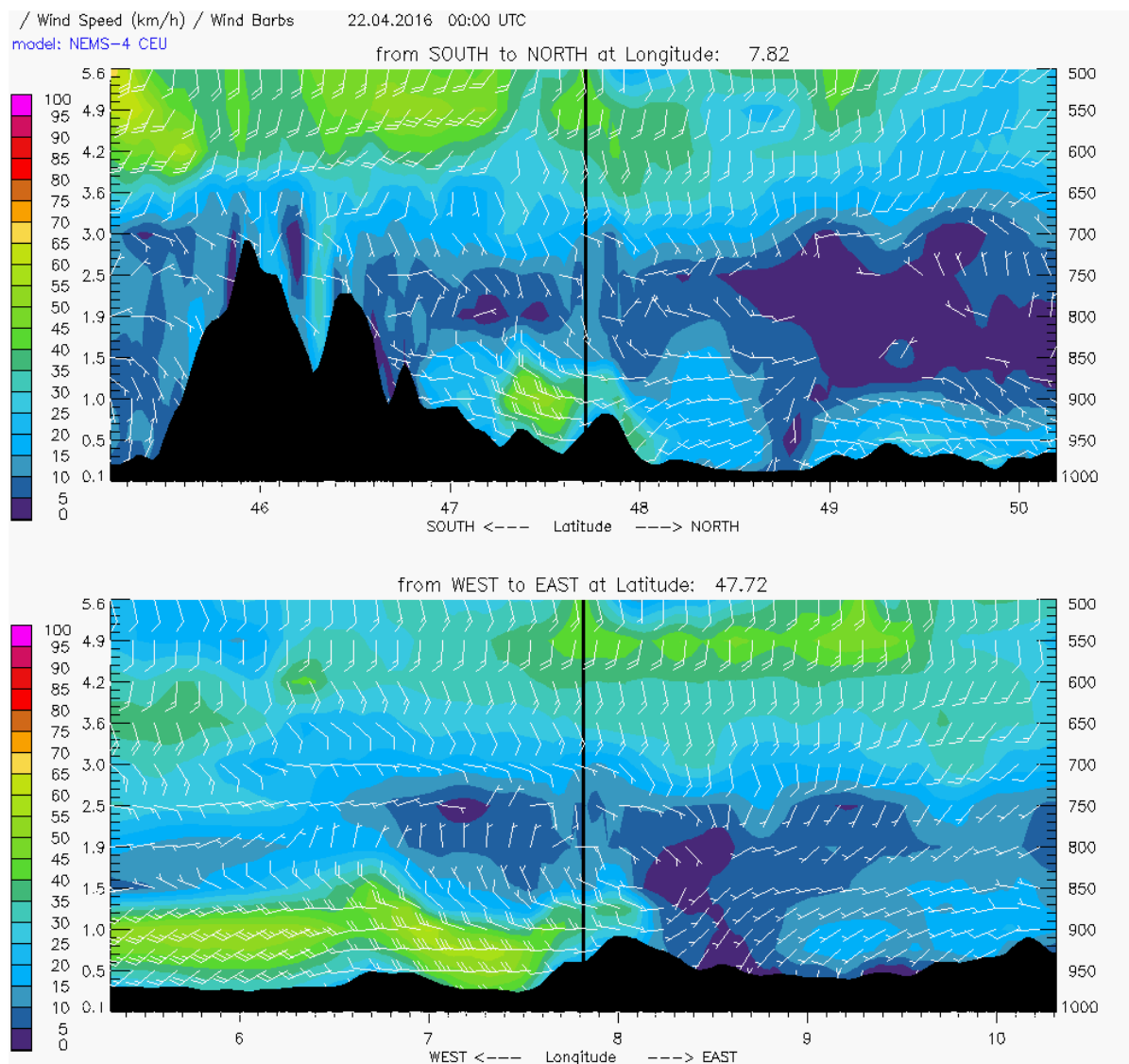


Figure 2.20: meteoblue API image "crossSection_wind"

2.21 Cross-section Relative Humidity

URL example:

http://my.meteoblue.com/visimage/crossSection_rh?apikey=xxxxxxx&lat=47.5584&lon=7.5733&asl=279&tz=Europe%2FZurich&city=Basel

Special variables:

&fcstlength= (show cross section for this forecast hour)

¶ms= (the length of the cross-section in degrees)

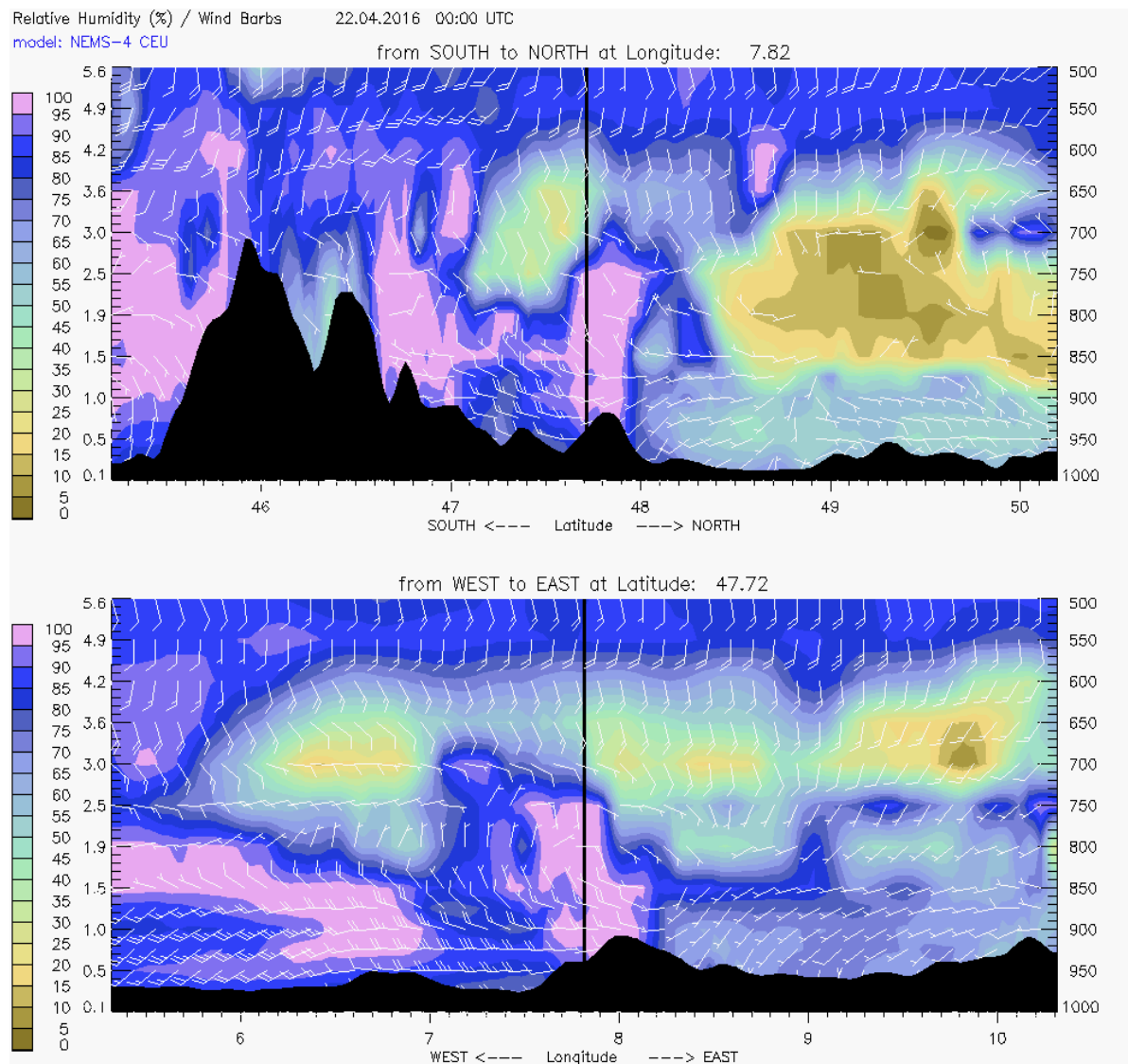


Figure 2.21: meteoblue API image "crossSection_rh"

2.22 myMap

URL example:

[http://my.meteoblue.com/visimage/pointmap_wind?](http://my.meteoblue.com/visimage/pointmap_wind?apikey=xxxxxxx&lat=47.5584&lon=7.5733&asl=279&tz=Europe%2FZurich&city=Basel&level=975m-look=WIND)

[apikey=xxxxxxx&lat=47.5584&lon=7.5733&asl=279&tz=Europe%2FZurich&city=Basel&level=975m-look=WIND](http://my.meteoblue.com/visimage/pointmap_wind?apikey=xxxxxxx&lat=47.5584&lon=7.5733&asl=279&tz=Europe%2FZurich&city=Basel&level=975m-look=WIND)

Special variables:

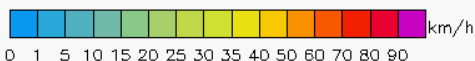
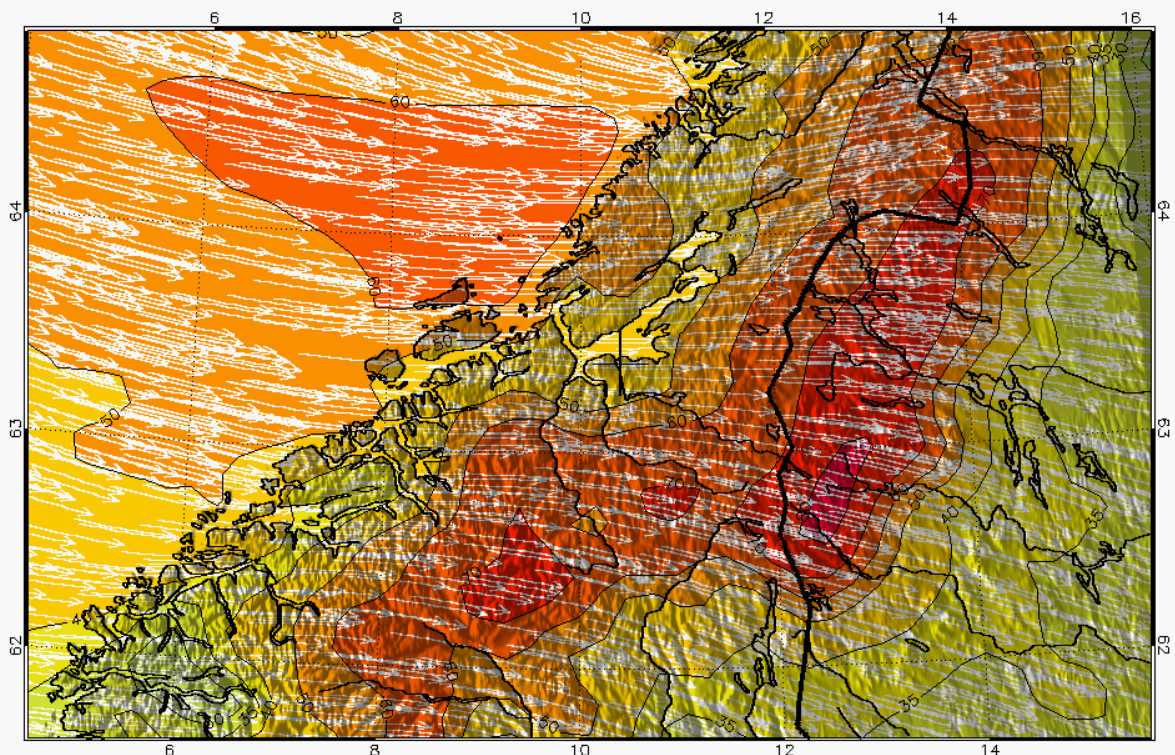
&fcstlenght=2015042307 (yyyy/mm/dd/hh)

&level=surface (or "975mb"; "950mb"; "900mb"; "850mb"; "800mb"; "750mb"; "700mb"; "650mb"; "600mb"; "550mb"; "500mb"; "450mb"; "400mb"; "350mb"; "300mb"; "250mb"; "200mb"; "150mb")

&look=WIND%2CKILOMETER_PER_HOUR%2CCELSIUS%2CZOOMNORMAL (instead of WIND "UPDRAFT" (convective updraft); "LI"(Lifted index); "TEMP" (Temperature); "PRECIP" (Precipitation); instead of ZOOMNORMAL "ZOOMOUT" or "ZOOMIN"; instead of KILOMETER_PER_HOUR "METER_PER_SECOND or "KNOT"; instead of CELSIUS "FAHRENHEIT").

Wind (km/h) (10 m above gnd) 23.04.2015 09:00 CEST/23.04.2015 07:00 UTC

meteoblue.com



Model: NEMS12 RUN: 22.04 2015 12:00 UTC

Figure 2.22: meteoblue API image "pointmap_wind"

2.23 Meteogram solpoint

URL example:

http://my.meteoblue.com/visimage/meteogram_solpoint?apikey=xxxxxxx&lat=47.5584&lon=7.5733&asl=279&tz=Europe%2FZurich&city=Base¶ms=13.454,180.20a

Special variables:

¶ms=kWp,facing angle, slope angle.

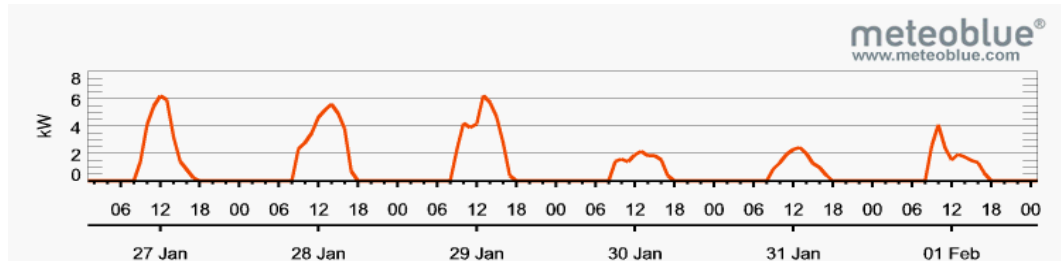


Figure 2.23: meteoblue API image "meteogram_solpoint"

2.24 Meteogram solarPVsimple

URL example:

http://my.meteoblue.com/visimage/solar_PVsimple?apikey=xxxxxxx&lat=47.5584&lon=7.5733&asl=279&tz=Europe%2FZurich&city=Basel¶ms=100,180,40

Special variables:

¶ms=kWp,facing angle,slope angle

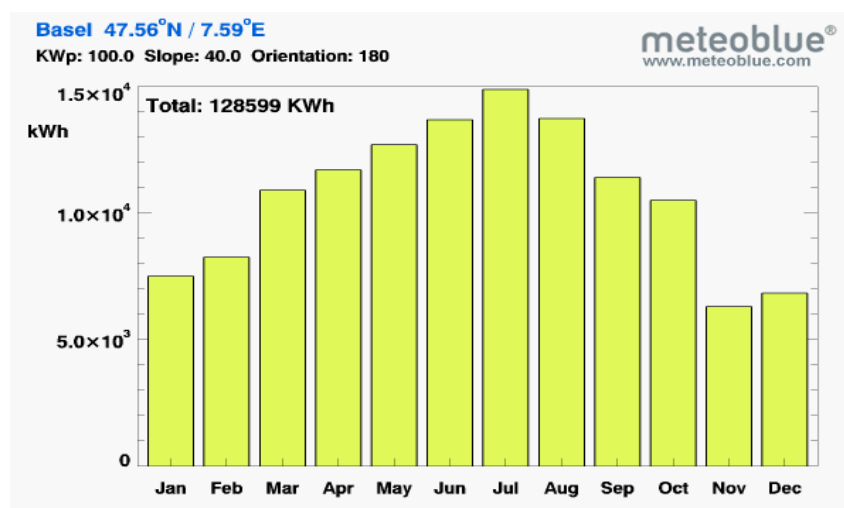


Figure 2.24: meteoblue API image "solar_PVsimple"

3 API data package usage and weather variables

3.1 Data request location and time

Forecasts are updated via a HTTP-request. One request is usually made for **one** location (point or grid cell) and timeframe. The data retrieved are pertinent for that location and the specified time range. The standard time range is 168 hours ahead, starting from either 00:00 or 12:00 UTC. In some little used geographical regions we only have 144h of forecast data.

3.2 Usage quota and accounting

Every API data package and image request is accounted. We provide detailed statistics on the number of daily requests. For example, if you request “basic-day_basic-3h”, each data package is accounted separately: basic-day_basic-3h = 1 request of basic-day and 1 request of basic-3h

You will be given a maximum amount of requests per day. For example 1'000 requests to “basic-day” and 1'000 requests to “basic-3h”. If you exceed your daily quota, an error message will occur on the following API requests.

Without further agreements we impose a rate limit of 500 requests per minute. If you plan to download more than 10'000 data packages, please evenly distribute your requests over a few hours.

3.3 Data package example API-URL

Example API-URL:

```
http://my.meteoblue.com/packages/basic-1h?  
name=Basel&lat=47.5584&lon=7.57327&asl=279&tz=Europe  
%2FZurich&apikey=personalAPIkey
```

This is an overview of the API-URL. **Blue and bold** means that this is fix and can not be changed by the customer. *Italic and light blue* means that can be changed by the customer. This example API-URL is an invalid demo URL.

Description

- “**http://my.meteoblue.com/packages/basic-1h?**” address and packages
- “**&lat=47.5584**” coordinates
- “**&lon=7.57327**” coordinates
- “**&asl=279**” altitude
- “**&apikey=personalAPIkey**” Personal APIkey

Optional settings

- “**&tz=Europe%2FZurich**” time zone
- “**&name=Basel**” location name, label your forecast, has no effect on data
- “**&temperature=C**” temperature unit
- “**&windspeed=ms-1**” wind speed unit
- “**&winddirection=degree**” wind direction unit
- “**&precipitationamount=mm**” precipitation amount unit
- “**&timeformat=Y-M-D**” Time format
- “**&format=json**” Output format

For correct daily aggregations it is best to **omit the “&tz=” parameter**, as then everything will be in local time including daylight saving (however over the ocean everything will be in UTC if you omit the tz).

If API-URL is opened in a web browser it will produce an output (json) like shown in Figure 3.1.

```
"data_day":
{
  "time": ["2016-01-12", "2016-01-13", "2016-01-14", "2016-01-15", "2016-01-16", "2016-01-17", "2016-01-18"],
  "pictocode": [7, 7, 11, 11, 13, 2, 13],
  "uvindex": [1, 1, 0, 1, 1, null, null],
  "temperature_min": [4.01, -0.31, -1.33, -0.82, -2.12, -5.22, -7.42],
  "temperature_max": [6.77, 3.85, 2.97, 2.66, 0.35, 0.85, -1.27],
  "felttemperature_min": [-1.19, -5.22, -6.24, -7.19, -7.58, -9.48, -12.83],
  "felttemperature_max": [2.01, -1.63, -2.62, -4.58, -4.67, -2.60, -5.89],
  "winddirection": [270, 270, 270, 270, 315, 135],
  "precipitation_probability": [69, 60, 88, 65, 73, 35, 66],
}
```

Figure 3.1: Example of raw data (basic in json format) accessed through the meteoblue API

3.4 Coordinates

- Latitude (lat): Geographic latitude of location in decimal degrees (WGS84) ranging from -90 (South) to +90 (North)
- Longitude (lon): Geographic longitude of location in decimal degrees (WGS84) ranging from -180 (West) to +180 (East)

3.5 Altitude (asl)

Altitude is expressed in metres (m) above sea level. If altitude is not provided to the API, a digital elevation model is used to determinate the altitude. The elevation model uses 60 metre spatial resolution, but might not always produce the desired result. If you do not know the altitude, please remove “&asl=” from the API-URL.

We recommend to provide the altitude to the API request if available.

3.6 Timezone (tz)

The timezone is used to provide data in local time. For autonomous systems we recommend to use UTC. Daylight saving time might otherwise cause problems as in a data shift of one hour.

For user interfaces data in local time is desired. You can provide “tz=Europe%2FZurich” to get data in CET or CEST timezone. “%2F” is an URL encoded slash “/”.

If the timezone is not provided to an API request, a time-zone database is used to get the timezone. For coastal areas UTC might be selected incorrectly. We recommend to provide the timezone, if available.

For fixed time offsets use for example GTM+2 for -02:00 UTC offset or GTM+ 02:30 for -02:30 offset.

A complete list of possible time zones can be found at [Wikipedia](#).

3.7 Time format

You can choose between the following time formats: ISO8601 (default), UTC timestamp (seconds), UTC timestamp (milliseconds), YMD, Y-M-D

Examples:

- ISO8601: 2016-02-10T03:00+01:00
- timestamp_utc: 1455069600
- timestamp_ms_utc: 1455069600000
- YMD: YYYYMMDD hh:mm: 20160210 03:00
- Y-M-D: YYYY-MM-DD hh:mm: 2016-02-10 03:00

Note: Timestamps are always returned in UTC timezone per definition. To get local time you have to apply the timezone-offset manually.

3.8 Weather variable units

The weather variable units can be changed with the API-URL generator.

Temperature:

- Temperature is available in Celsius (°C) and Fahrenheit (°F)
- API-URL “&temperature=...”: Celsius=C; Fahrenheit=F

Wind speed:

- Wind speed is available in metre per second (m/s), kilometre per hour (km/h), miles per hour (mph), knot (kn), beaufort (bf)
- API-URL “&windspeed=...”: metre per second=ms-1; kilometre per hour=kmh; miles per hour=mph; knot=kn ; beaufort=bft

Wind direction:

- Wind direction is available in degree (°), 2 character and 3 character:
 - 0°/360° (North): Wind blows from the North to the South (↓)
 - 90° (East): Wind blows from the East to the West (←)
 - 180° (South): Wind blows from the South to the North (↑)
 - 270° (West): Wind blows from the West to the East (→)
 - 2 character: N, NW, SW, W, SE, E, NE, E → 45° distance
 - 3 character: N, NNE, NE, ENE, E, ESE, SE, S etc. → 22.5° distance
- API-URL “&winddirection=...”: degrees=degree; 2 character= 2char; 3 character= 3char

Precipitation amount:

- Precipitation is available in millimetres and inches
- API-URL “&precipitationamount=...”: millimetre=mm; inches=inch

PV pro parameter:

Please add additional information for solar options: slope, kilowatt peak, facing, tracker:

- API-URL: “&slope=...&kwp=...&facing=...&tracker=...”
- slope = inclination
- kwp= kilowatt peak
- facing = orientation
- tracker = fixed, mono-axial, biaxial

3.9 Output format (format)

Currently only json and csv are supported. Additional formats might follow as per customer requirements. csv output format only supports a single time-resolution. In order to request “daily” and “3-hourly” data, you would have to make two API requests.

3.10 Shared secret

Your API-request is only authorised by your APIkey. To prevent unauthorized access and "reply attacks" we offer a signature mechanism with a shared secret. On request we will associate a shared secret with your APIkey and enforce the signature security policy. To sign a request you have to add an unix timestamp to your URL and calculate a MD5 hash of the whole request string and the assigned shared secret.

3.11 rainSPOT

The rainSPOT represents the precipitation distribution around the chosen location. It is 7x7 array encoded from south to north, west to east.

0=no rain, 1=light rain (0.2-1.5mm), 2=medium (1.5-5mm), 3=heavy(>5mm), 9=shower(0.02-0.2mm)

The meteoblue API will produce an output like this:

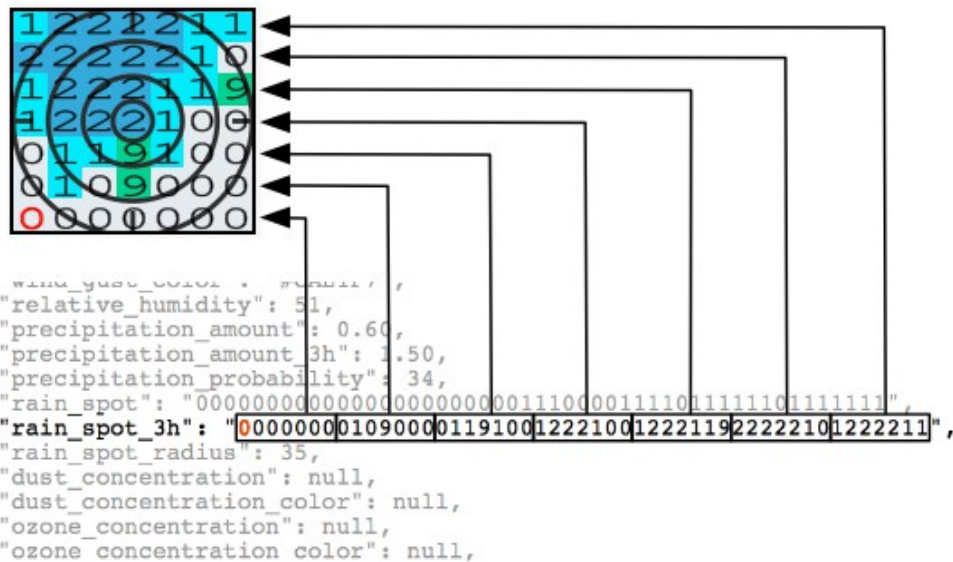


Figure 3.2. Distribution of rainSPOT

Please mind that the first digit in the API output represents the first value of the last line of the rainSPOT (see 0 in the figure above).

4.2.2 csv format

You can only select one package and only one time interval per package:

- 1. request: **basic-1h**
- 2. request: **basic-3h**
- 3. request: **agro-day**

If API-URL is opened in a web browser it will produce an output like this:

```
time,precipitation,precipitation_type,rainspot,temperature,felttemperature,pictocode,windspeed,winddirection,relativehumidity,sealevelpressure,precipitation_probability
2016-02-02 02:00,0.56,1,000000009999009999111101111119111111111111111111119000,-4.25,-17.07,34,14.58,53,94,989.00,87
2016-02-02 03:00,0.83,1,09990001111111111111111111111911111111111111111111999,-4.69,-17.94,34,15.13,51,94,989.60,90
2016-02-02 04:00,0.65,1,999900011999909111110911111011111191111191119000,-5.24,-18.71,34,15.36,48,94,990.00,96
2016-02-02 05:00,0.56,1,900000009999911009111110911111011111111111191119900,-5.70,-19.16,34,15.27,46,93,989.70,96
2016-02-02 06:00,0.57,1,09999999911111009111110011111011111111111119111199,-6.00,-19.40,34,15.13,44,92,989.50,96
2016-02-02 07:00,0.48,1,99999190999911000911100111110111111111111191111900,-6.12,-19.59,34,15.21,43,92,989.60,96
2016-02-02 08:00,0.50,1,99999190099990009911001111101111111111111901190000,-6.05,-19.45,34,15.13,44,93,989.80,89
2016-02-02 09:00,0.40,1,9999999000099990009999001111011111991119000000000,-5.96,-19.40,34,15.21,47,93,990.10,86
2016-02-02 10:00,0.40,1,99999990000999900099190011111011111001110000000000,-6.32,-20.01,34,15.51,48,92,989.80,87
2016-02-02 11:00,0.30,1,999999900009999000999900911109111900910000000000,-7.05,-21.11,34,15.93,48,91,989.40,87
```

Figure 4.2: Example of raw data (basic in csv format) accessed through the meteoblue API

5 Modelling

5.1 Update times

meteoblue generally uses 2 model runs per day. The runs are based on the assimilations for 00:00 UTC and 12:00 UTC. Initialisation generally takes place 2 hours after assimilation. Actualisation are made between 6 and 8 hours after assimilation. Depending on the update timing by the customer, the last change may be reflected (or not). In unstable weather, these changes may be significant.

5.2 Post-processing

Some data packages contain hourly updates (post-processing) from weather station, some not. If a forecast for the same location is made using different data packages, these may result in different values for the variables which are modified by post-processing. As a result, you may occasionally get substantial differences. Further differences originate from different providers using different forecast models.

There are 3 types of post-processing methods:

5.2.1 MOS

Using past 1 year of measurement data to correct the forecast for a particular variables (temperature, relative humidity, windspeed, radiation). This is station dependant.

5.2.2 Kalman filter

Using past 1 week of measurement data to correct the forecast for particular variables (temperature, relative humidity, windspeed, radiation). This is station dependant.

5.2.3 NOWcast

Using past 1 hour of measurement data to correct the forecast for a particular variables (temperature, relative humidity, windspeed, radiation, precipitation in some areas). This is area and station dependant, and can also happen independent of a customer station, by using other nearby data sources.

– End of document –